

Titanium Boride Surface Hardening

U N I V E R S I T Y O F U T A H

CENTER

The focus of this Center is commercialization of a variety of materials using titanium monoboride (TiB) in applications requiring excellent corrosion and wear resistance. Traditionally, titanium diboride has been used in these applications, but the high cost and manufacturing difficulty have been limiting. Titanium monoboride has the unique advantage of combining similar corrosion and wear resistance in addition to electrical conductivity with less expensive manufacturing techniques. The nanostructured bulk titanium boride and the functionally graded titanium boride are novel material technologies for innovative applications such as armor, medical devices, electrodes, gun barrels and die inserts.

TECHNOLOGY

The Center has three major technologies involving its novel TiB: the incorporation of TiB crystals to harden the surfaces of titanium; creation of nanostructured titanium boride bulk material; and functionally graded titanium boride materials for high performance components and devices.

TiB-hardened surfaces provide great advantages over current materials in biomedical implant devices and bearings and gears, reducing contamination problems and increasing the stiffness-to-weight ratio. The functionally graded TiB provides advantages in armor and gun barrel systems, offering a fracture-resistant, highly-graded material.

ACCOMPLISHMENTS

Now in its third year, the Center is continuing to improve the nanostructured titanium boride material and expects approval of its patent in early 2007. The Center also continues to work with its benefiting company, Ortho Development Corporation, and is now pursuing non-medical applications for its technology. With successful development of a ballistic test apparatus and armor plates now complete, the Center is looking into the establishment of a spinout for manufacturing and consulting services.

THINK TANK

What if there was...

An inexpensive material with superior corrosion resistance that could be used in armor and medical devices?



Ravi Chandran
University of Utah
135 S. 1460 E. Rm. 412
(801) 581-7197
ravi@mines.utah.edu